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A BIOLOGICAL EVALUATION OF MOUNTAIN PINE BEETLE INFESTATIONS WITHIN THE SIMMONS CREEK DRAINAGE ST. JOE NATIONAL FOREST, IDAHO

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A BIOLOGICAL EVALUATION OF MOUNTAIN PINE BEETLE INFESTATIONS WITHIN THE SIMMONS CREEK DRAINAGE ST. JOE NATIONAL FOREST, IDAHO 1966

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SUMMARY

Mountain pine beetle damage within old growth western white pine stands along the Simmons Creek drainage, St. Joe National Forest, Idaho, has increased during the past 2 years. The degree of damage and infestation trends for 1967 were determined. The average number of beetle-killed trees increased from 0.39 per acre in 1965 to 1.03 in 1966. Biological data obtained from the examination of 137 trees infested in 1966 indicated there might be a slight increase in the number of trees attacked in 1967. One of the greatest losses in volume within these stands is being caused by blister rust. An average of 14.72 trees per acre were top-killed by this fungus during 1966.

Locations of infested groups of trees spotted during an aerial survey compared closely to groups located on the ground. Indications are that landowners could use results from aerial surveys to plan boundaries of clearcuts within infested areas.

INTRODUCTION

Chronic infestations of mountain pine beetles have been recorded since 1934 in overmature white pine stands within the St. Joe River drainage. Furthermore, they fluctuate in activity periodically. Losses within the Simmons Creek tributary have accelerated during the past 2 years. An aerial survey of this infestation was made and its potential evaluated during August 1966 by Scott Tunnock, Forest Pest Control Branch, Division of State and Private Forestry. Ronald Cox and Frank Netherton, St. Joe National Forest, surveyed the area to determine the number of trees attacked in 1965 and 1966.

This biological evaluation is a reappraisal of mountain pine beetle activity in the Simmons Creek drainage. Results of an evaluation in 1965 predicted the

increase in the number of trees attacked during 1966. Other evaluations similar to this were made along the St. Joe River drainage in 1958,[1] 1959,[2] and 1964.[3]

TECHNICAL INFORMATION

Causal agent.--The mountain pine beetle, Dendroctonus ponderosae Hopk.

Host.--Western white pine, Pinus monticola Dougl.

Type of damage.--The beetles killed trees from 8 to 30 inches in diameter by feeding on their phloem and cambium tissues. A few single trees were attacked, but groups containing 2 to 10 killed trees were more common.

Location of outbreak.--Attacked trees are concentrated in white pine stands growing along Simmons Creek (T. 44 N., Rs. 9 and 10 E.) from its north fork junction, east to Dolly Creek, and up Three Lakes Creek to section 35 (fig. 1).

Extent of outbreak.--About 1,624 acres contained killed trees, and in 1966 this averaged about one currently infested tree per acre. This infested area was divided for sampling purposes into three units (A, B, and C) based on concentrations of damaged trees (fig. 1). The extent of the infestation in the three units was determined as follows: strips, running from the northern to southern boundaries of the infested area were laid out at 5-chain intervals (fig. 2). One-tenth-acre plots were sampled every 2 chains along the strips. Plot data consisted of the number of white pine trees attacked by mountain pine beetles in 1965 and 1966, the number of undamaged pines, and the number of pines top-killed by blister rust. A summary of these data is presented in table 1.

In the three units, the number of western white pine trees per acre killed by mountain pine beetles increased from 1965 to 1966 (table 1). The number of trees top-killed by blister rust in units A, B, and C were 14.95, 12.14, and 16.58 per acre respectively.

1/ Tunnock, A., Biological evaluation of mountain pine beetle infestations in the St. Joe National Forest, Idaho. Unpublished report filed at Div. of State and Private Forestry, U.S. Forest Service, Missoula, Montana, 1958.

2/ Tunnock, A., Evaluation of mountain pine beetle infestations, St. Joe National Forest, Idaho. Unpublished report filed at Div. of State and Private Forestry, U.S. Forest Service, Missoula, Montana, 1959.

3/ Tunnock, S., Evaluation of mountain pine beetle damage in northern Idaho and Montana. Unpublished report filed at Div. of State and Private Forestry, U.S. Forest Service, Missoula, Montana, 1964.

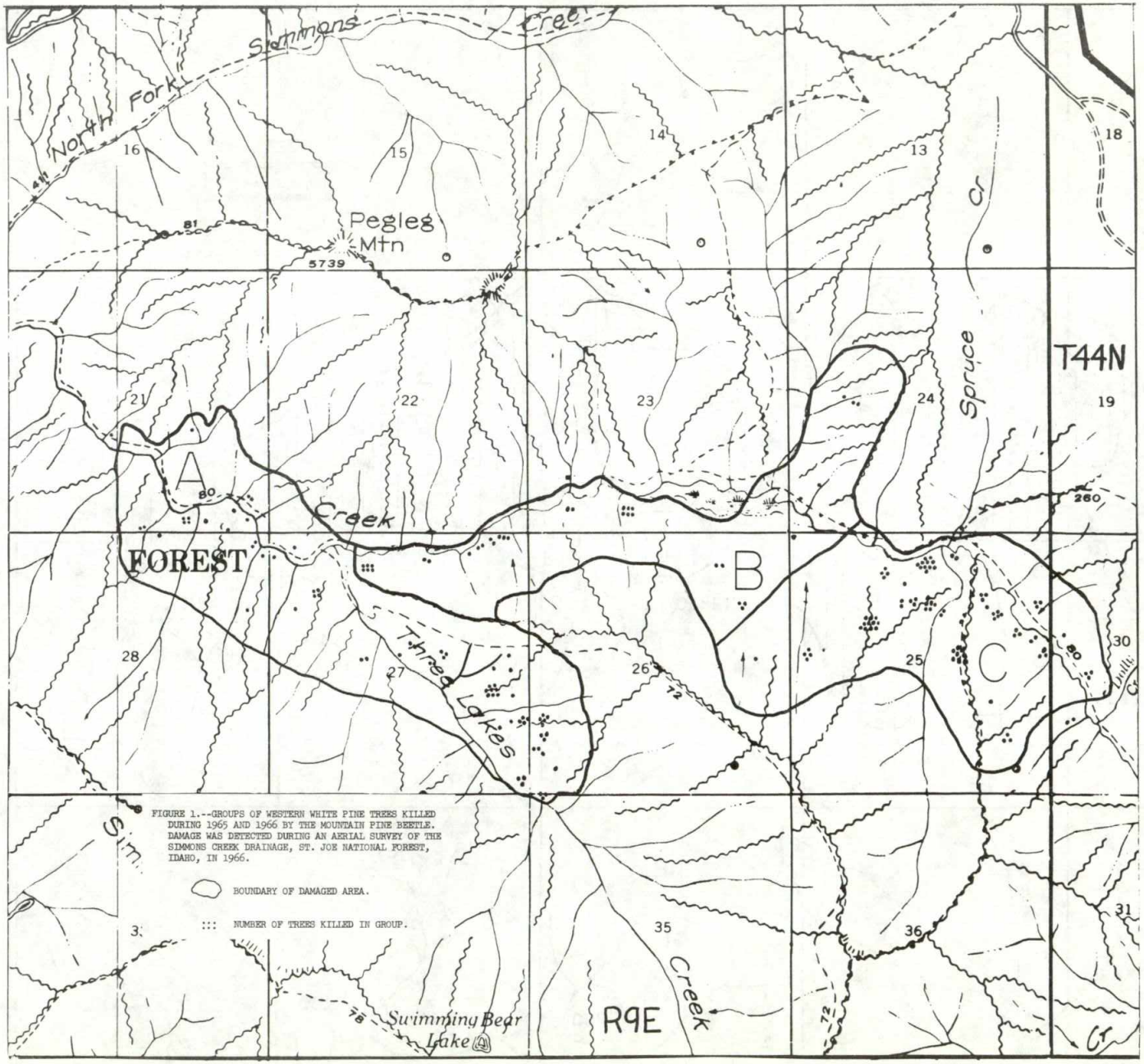

FIGURE 1.--GROUPS OF WESTERN WHITE PINE TREES KILLED DURING 1965 AND 1966 BY THE MOUNTAIN PINE BEETLE. DAMAGE WAS DETECTED DURING AN AERIAL SURVEY OF THE SIMMONS CREEK DRAINAGE, ST. JOE NATIONAL FOREST, IDAHO, IN 1966.

BOUNDARY OF DAMAGED AREA.

::: NUMBER OF TREES KILLED IN GROUP.

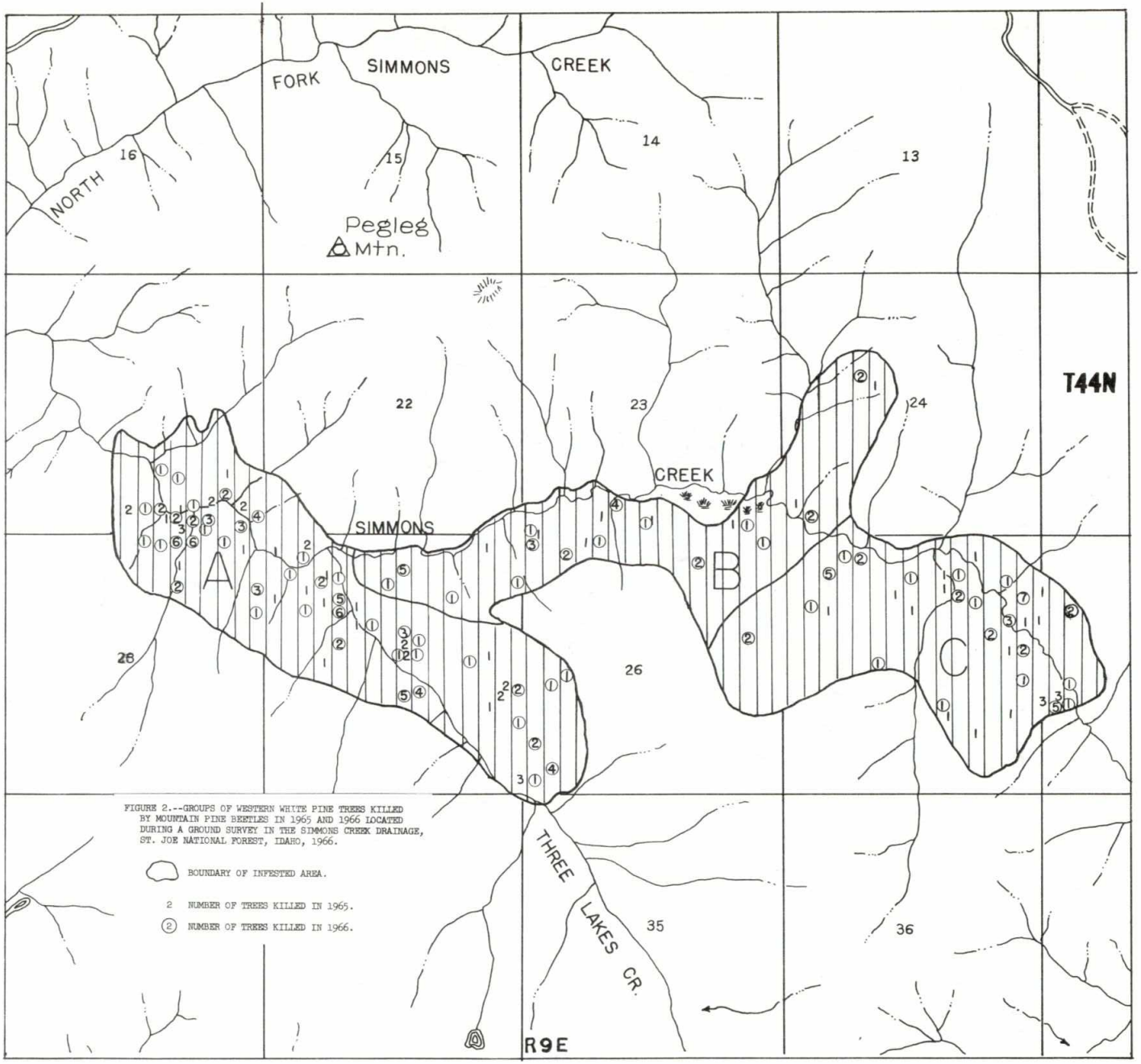

FIGURE 2.--GROUPS OF WESTERN WHITE PINE TREES KILLED BY MOUNTAIN PINE BEETLES IN 1965 AND 1966 LOCATED DURING A GROUND SURVEY IN THE SIMMONS CREEK DRAINAGE, ST. JOE NATIONAL FOREST, IDAHO, 1966.

BOUNDARY OF INFESTED AREA.

2 NUMBER OF TREES KILLED IN 1965.

(2) NUMBER OF TREES KILLED IN 1966.

Table 1.--Damage caused by mountain pine beetles and blister rust, and infestation trends for 1967 in three units of western white pine stands within the Simmons Creek drainage, St. Joe National Forest, Idaho

Subject	Units[1/] A	B	C	Means
Acres in unit	649	443	532	
Infestation trend 1967	Very slight increase	Static	Slight increase	--
Undamaged western white pine per acre	27.87 ± 3.18	28.28 ± 1.45	22.39 ± 1.65	26.19 ± 1.36
Beetle-killed western white pine per acre in 1965	0.58 ± 0.12	0.18 ± 0.06	0.34 ± 0.10	0.39 ± 0.06
Beetle-killed western white pine per acre in 1966	1.45 ± 0.29	0.65 ± 0.20	0.83 ± 0.18	1.03 ± 0.14
Western white pine top-killed by blister rust per acre	14.95 ± 1.14	12.14 ± 0.72	16.58 ± 1.19	14.72 ± 0.62

1/ See figure 1 or 2 for location of units.

The method used to predict the trend of the infestation in 1967 was based on the Bedard-Terrell[4/] formula. Data included tree size, attack density, brood abundance, brood development, and abundance of predators. These data were obtained from 46 trees infested during 1966 in unit A, 48 trees in unit B, and 43 trees in unit C. Predictions for 1967 are: a very slight increase in the number of trees killed in unit A, static conditions in unit B, and a slight increase in kill within unit C.

On August 19, groups of western white pine trees showing symptoms of being attacked by mountain pine beetles in 1965 and 1966 were detected from a helicopter and "pin-pointed" on a map of the Simmons Creek drainage (fig. 1). The purpose was to determine if mountain pine beetle damage could be located accurately enough from the air to enable a landowner to mark out the boundaries of clearcuts. Locations of infested groups spotted from the air (fig. 1) compare closely to those located during ground surveys (fig. 2). Therefore, an aerial survey could provide adequate data for planning boundaries of clearcuts designed to log beetle-killed and susceptible western white pine trees.

Environmental factors.--There was no obvious upset of environmental conditions that could have caused this outbreak.

DISCUSSION

Most of the western white pine trees in the infested area are more than 100 years old. This age group is very susceptible to attack by mountain pine beetles. Damage in these old growth stands fluctuates annually. Losses range from 0.5 to 4.0 or 5.0 percent; over the years, the average is about 2.5. Beetle populations usually increase for about 3 years or until the high level of loss occurs, then decrease to the low level again.

The number of trees killed by beetles in the Simmons Creek drainage has increased during the past 2 years and a slight increase is expected during 1967. There is good probability damage will start to decline by 1968. However, results from this survey indicate that some of the greatest volume losses within the drainage are being caused by blister rust (table 1), and damage is expected to increase annually.

4/ Bedard, W. D. and T. T. Terrell. A method for predicting the trend of mountain pine beetle infestations in western white pine. Unpublished report filed at Div. of State and Private Forestry, U.S. Forest Service, Missoula, Montana, 1939.

RECOMMENDATIONS

There is no practical method of controlling mountain pine beetle infestations in old growth western white pine stands. Removal of the old growth by logging reduces the incidence of attacks.

The St. Joe National Forest plans to build roads into the Simmons Creek drainage. Clearcuts are being formulated within the boundaries of the infested area.